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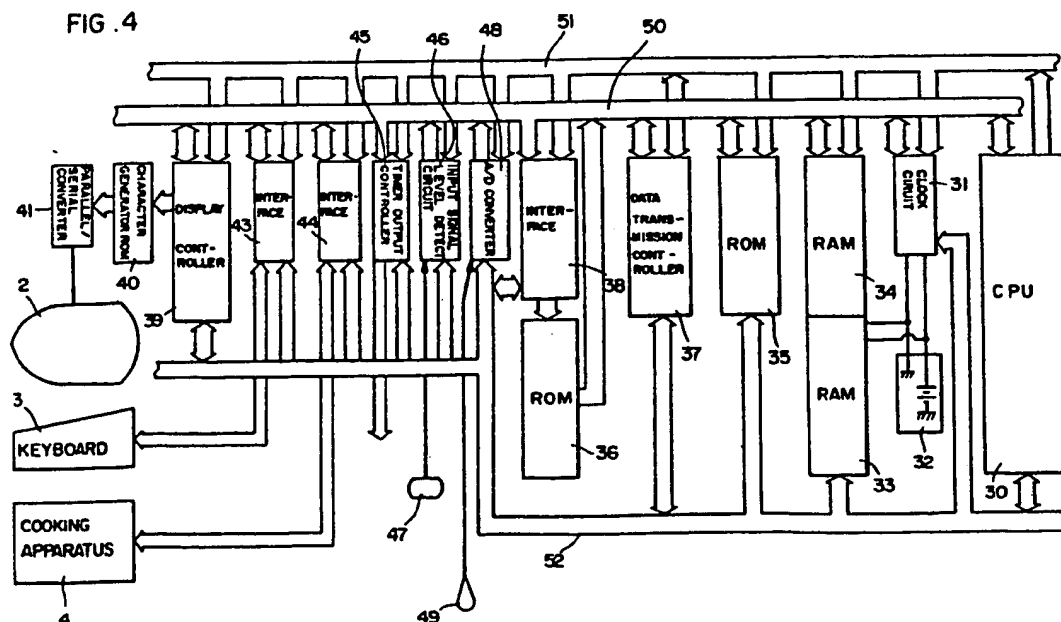
(54) Home controller

(57) A controller for home use e.g. for cooking apparatus (4) and the management of schedules:
after input (3) of a date, enables continuous registering of schedules on the same day without repeating inputs of the date,

displays (2) a calendar with applied marks on the dates on which schedules are registered, and displays the schedules of dates selected by positioning a cursor,

on command automatically steps through a sequence of dates, displaying the date and displays the schedules at the displayed date on command;

is so constructed that registration and read-out of schedules are allowed only after the content of a schedule storage device has been checked, thereby preventing a runaway of the system as a whole;
can store and display ingredients and recipes for a large number of menus.



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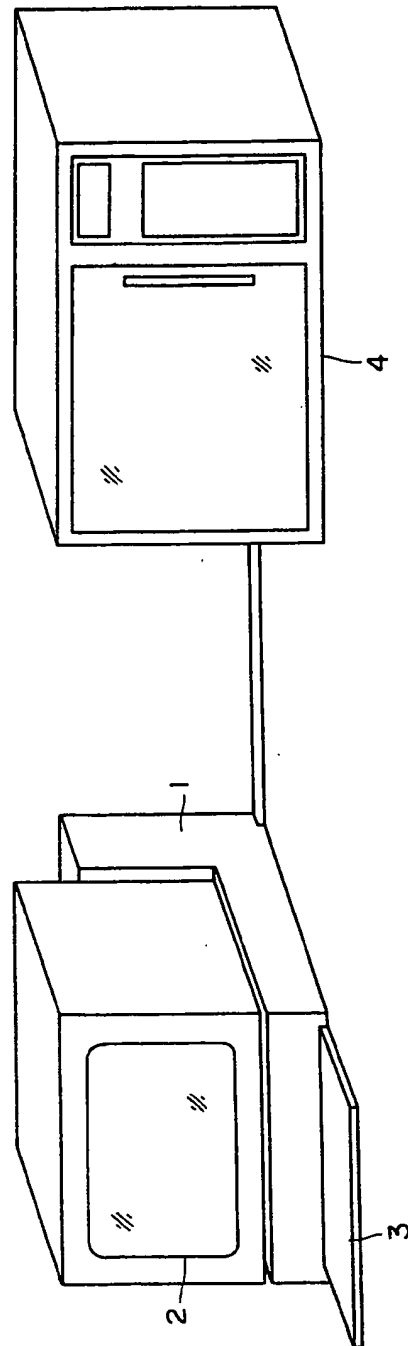


FIG. 1

FIG. 2

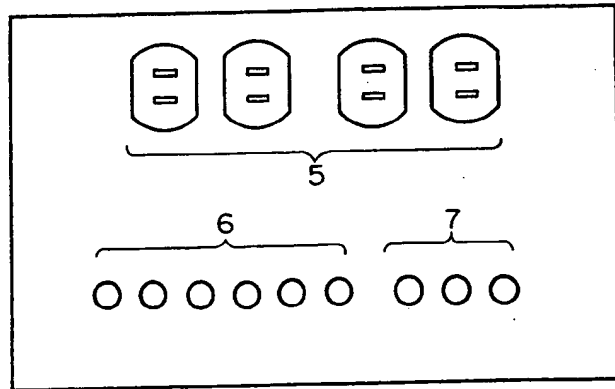
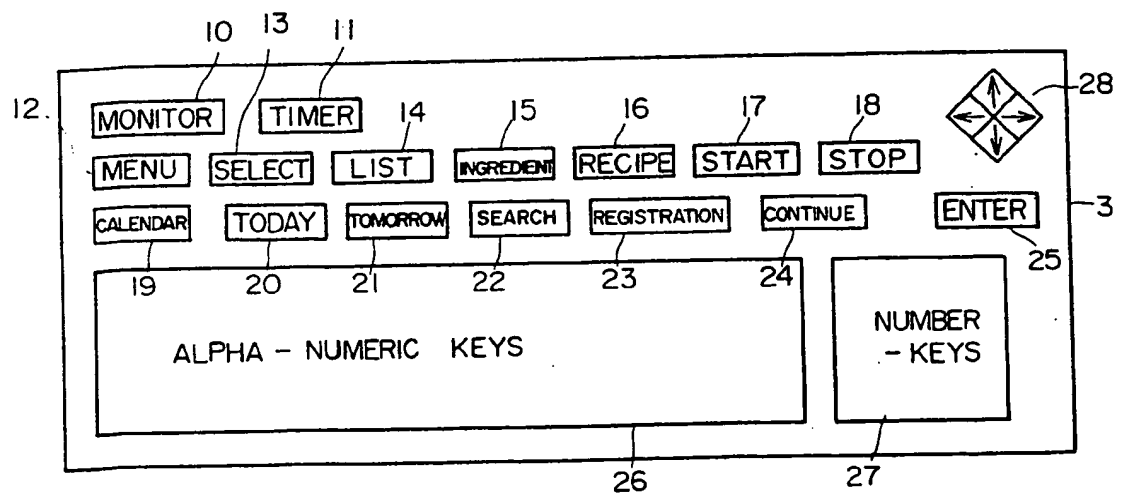
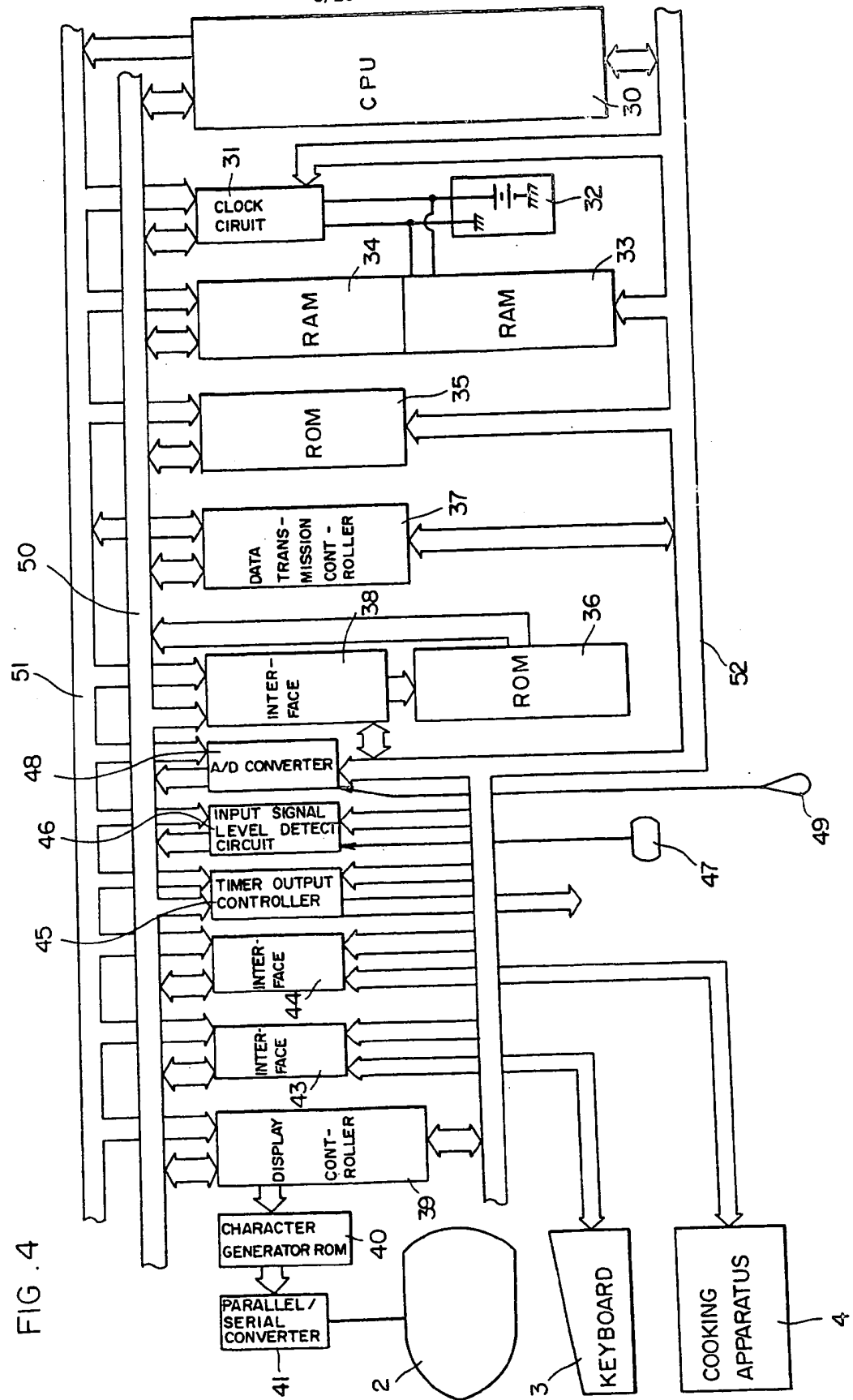


FIG. 3





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FIG. 5

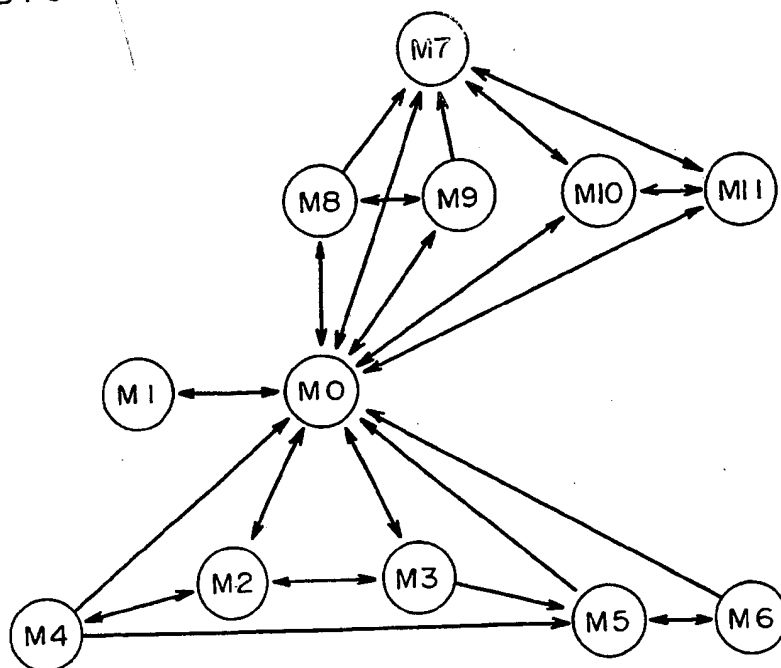


FIG. 6

X X X X X HOME CONTROLLER X X X X X									
5 : 55					05 PM				
APR 19 1983 TUE									
TEMPERATURE					A 73 ° F (23°C)				
					B 82 ° F (28°C)				
TIMER No.	1	2	3	4	5	6	7	8	M
PROGRAM	◆	◆		◆		◆		◆	
ON STATE		◆							
SCHEDULE	TODAY ◆ TOMORROW								
■ SCHEDULE	■ TIMER		■ CALENDAR		■ M.M				
■ COOKING	■ RECIPE No.		SELECT						

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FIG. 7

TIMER PROGRAMMING

TIMER	No.	ON	OFF
1	-----	11:10 AM	----- 4:15 PM
2	-----	5:55 PM	----- 7:00 PM
3	-----		-----
4	-----	S1	----- S5
5	-----		-----
6	-----	6:00 AM	----- 6:10 AM
7	-----		-----
8	-----	S2	----- 5:00 PM

Enter
 TIMER No. & REPEAT MARK (IF DESIRED)
 then touch ENTER Key!

X CONDITIONS X
 Time
 Hour Minuts
 AM / PM
 Sensors
 S1 ~ S5

■ MONITOR

FIG. 8

MAY 1983

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		X				
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
				X		
22	23	24	25	26	27	28
29	30	31				



FIG.9

◆ MENU ◆ Your choice OO

Take your choice with NUMBER keys
and then touch ENTER key !

1 APPETIZERS	10 SEAFOOD
2 SOUPS	11 EGG
3 DRINKS	12 RICE
4 SAND WICHES	13 PASTE
5 BREAD	14 VEGETABLES
6 BEEF	15 SAUCE
7 LAMB	16 DESSERTS
8 PORK	17 DEFROST
9 CHICKEN	18 WHOLE MEAL

* * *

■ RECIPE No. SELECT

■ MONITOR

FIG.10

CHICKEN Your choice OOO

Take your choice with NUMBER keys and
touch ENTER key to look INGREDIENT
or touch OVEN START key to cook

122: CHICKEN LIVER CHOW MEIN

123: BERBECUED CHICKEN

124: BREAST OF TURKEY JARDINIERE

125: CHICKEN MILANO

126: CHICKEN MARENGO

127: CHICKEN SUKIYAKI

128: CHICKEN DIECES

129: CHICKEN AND VEGETABLES

130: CHICKEN WHOLE

131: CHICKEN CUT UP

132: CHICKEN VERONIQUE

133: DUCKLING

134: EASY BAKED CHICKEN

Touch CONTINUE key for more repertoire

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FIG. 11

BARBECUED	CHICKEN	123
INGREDIENT		
- 4 Servings -		
1. broiler fryer chicken. 2. 1/2 pounds: quartered		
1/2 cup Spicy Barbecue Sauce		
1 tablespoon dried parsley flakes		
1 tablespoon onion flakes		
■ MENU	■ RECIPE No.	SELECT
■ RECIPE LIST	■ OVEN	START
■ RECIPE	■ MONITOR	

FIG. 12

BARBECUED	CHICKEN	123
RECIPE		
Total Cooking Time : 18 to 20 minutes		
Arrange chicken pieces. Skin side down with thick edges toward outside of 12 x 7 x 2 - inch microproof baking dish. Combine remaining ingredients. Brush half the sauce over top of chicken. Cover and Touch START. Turn chicken brush with remaining sauce. Cover and Touch START. Let stand. Covered 5 minutes before serving.		
■ MENU	■ RECIPE No.	SELECT
■ RECIPE LIST	■ OVEN	START
■ INGREDIENT	■ MONITOR	

FIG.13

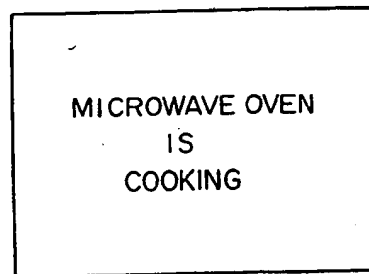


FIG.14

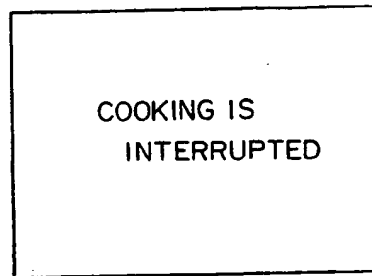


FIG.15

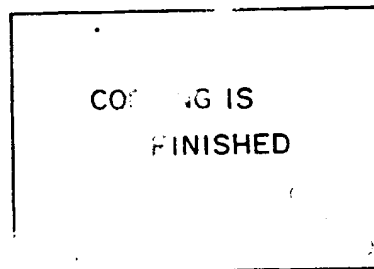
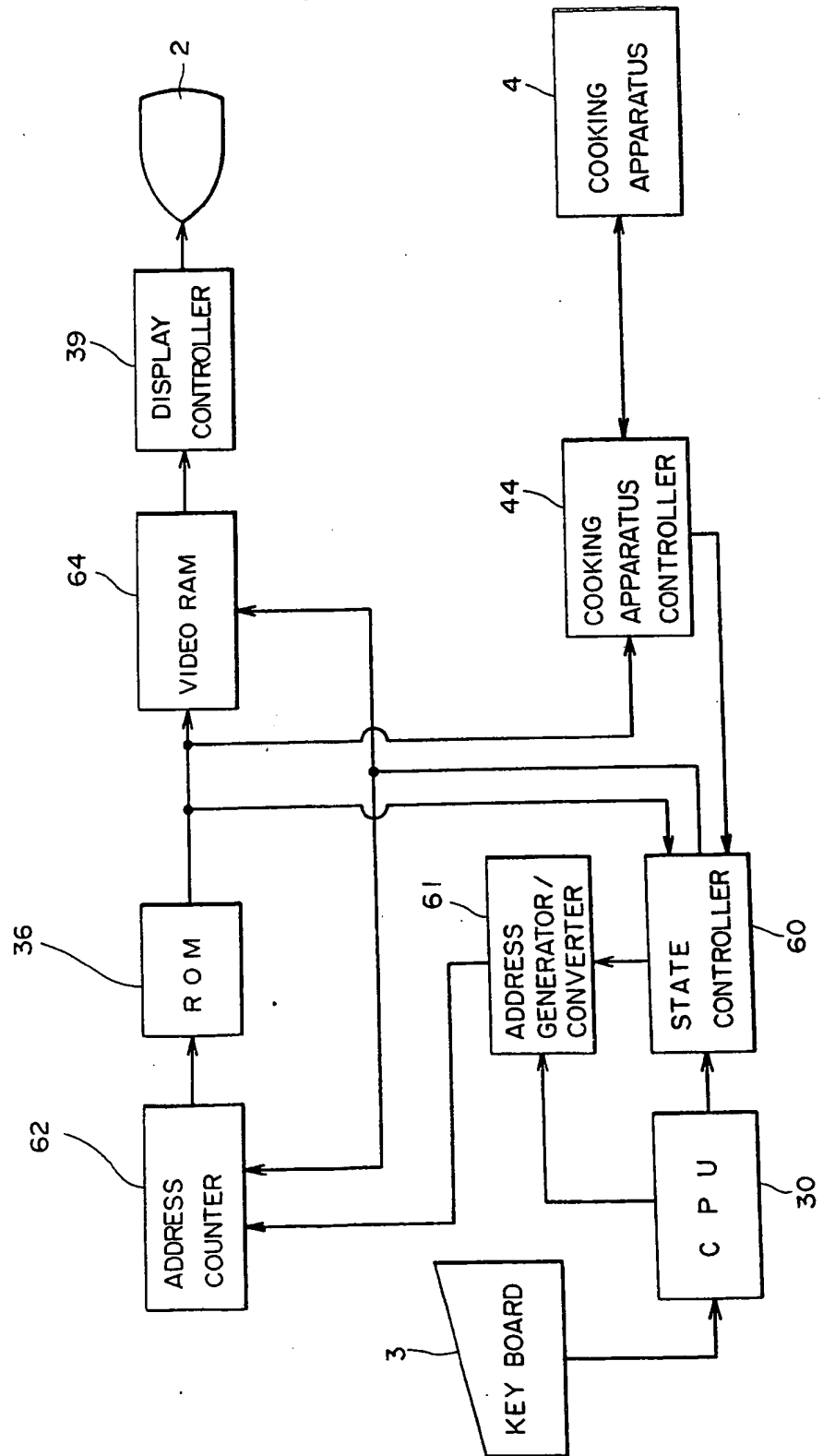


FIG. 16



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graph TD
    START([START]) --> MENU_KEY_1{MENU KEY ?}
    MENU_KEY_1 -- NO --> MENU_KEY_1
    MENU_KEY_1 -- YES --> STORE_RECIPES[STORE RECIPE MODE]
    STORE_RECIPES --> TRANSFER_HEAD[TRANSFER HEAD ADDRESS OF ROM TO ADDRESS COUNTER]
    TRANSFER_HEAD --> DISPLAY_SORTING[DISPLAY MAJOR SORTING LIST]
    DISPLAY_SORTING --> NUMBER_KEYS_1{NUMBER - KEYS ?}
    NUMBER_KEYS_1 -- NO --> NUMBER_KEYS_1
    NUMBER_KEYS_1 -- YES --> CLEAR_POINTER_1[CLEAR OPERATION STATE MANAGEMENT POINTER]
    CLEAR_POINTER_1 --> ENTER_KEY_1{ENTER KEY ?}
    ENTER_KEY_1 -- NO --> ENTER_KEY_1
    ENTER_KEY_1 -- YES --> DISPLAY_COOKERY[DISPLAY SELECTED COOKERY]
    DISPLAY_COOKERY --> NUMBER_KEYS_2{NUMBER - KEYS ?}
    NUMBER_KEYS_2 -- NO --> NUMBER_KEYS_2
    NUMBER_KEYS_2 -- YES --> CLEAR_POINTER_2[CLEAR OPERATION STATE MANAGEMENT POINTER]
    CLEAR_POINTER_2 --> DISPLAY_INGREDIENT[DISPLAY INGREDIENT]
    DISPLAY_INGREDIENT --> START_KEY_1{START KEY ?}
    START_KEY_1 -- YES --> START_KEY_1
    START_KEY_1 -- NO --> RECIPE_KEY{RECIPE KEY ?}
    RECIPE_KEY -- NO --> RECIPE_KEY
    RECIPE_KEY -- YES --> DISPLAY_RECIPES[DISPLAY RECIPE]
    DISPLAY_RECIPES --> INGREDIENT_KEY{INGREDIENT KEY ?}
    INGREDIENT_KEY -- NO --> INGREDIENT_KEY
    INGREDIENT_KEY -- YES --> START_KEY_1
    INGREDIENT_KEY -- NO --> TRANSFER_ADDR[TRANSFER ADDRESS TO COOKING APPARATUS CONTROLLER]
    TRANSFER_ADDR --> START_COOKING[START COOKING]
    START_COOKING --> COOKING_RUNNING{COOKING APPARATUS RUNNING ?}
    COOKING_RUNNING -- NO --> COOKING_RUNNING
    COOKING_RUNNING -- YES --> DISPLAY_NOMAL[DISPLAY NOMAL OPERATION]
    DISPLAY_NOMAL --> STOPPAGE{STOPPAGE ?}
    STOPPAGE -- NO --> STOPPAGE
    STOPPAGE -- YES --> INTERRUPTION{INTERRUPTION ?}
    INTERRUPTION -- YES --> INTERRUPTION
    INTERRUPTION -- NO --> DISPLAY_FINISHED[DISPLAY "FINISHED"]
    DISPLAY_FINISHED --> START_2([START])
    START_2 --> TRANSFER_ADDR
    INTERRUPTION -- YES --> DISPLAY_INTERRUPT[DISPLAY INTERRUPTION]
    DISPLAY_INTERRUPT --> INCREMENT_POINTER[INCREMENT OPERATION STAGE MANAGEMENT POINTER]
    INCREMENT_POINTER --> START_KEY_2{START KEY ?}
    START_KEY_2 -- NO --> START_KEY_2
    START_KEY_2 -- YES --> RESTART_OPERATION[RESTART OPERATION]
    RESTART_OPERATION --> START_KEY_2
    START_KEY_2 -- NO --> MENU_KEY_2{MENU KEY ?}
    MENU_KEY_2 -- NO --> MENU_KEY_2
    MENU_KEY_2 -- YES --> START_1([START])
    START_1 --> TRANSFER_ADDR
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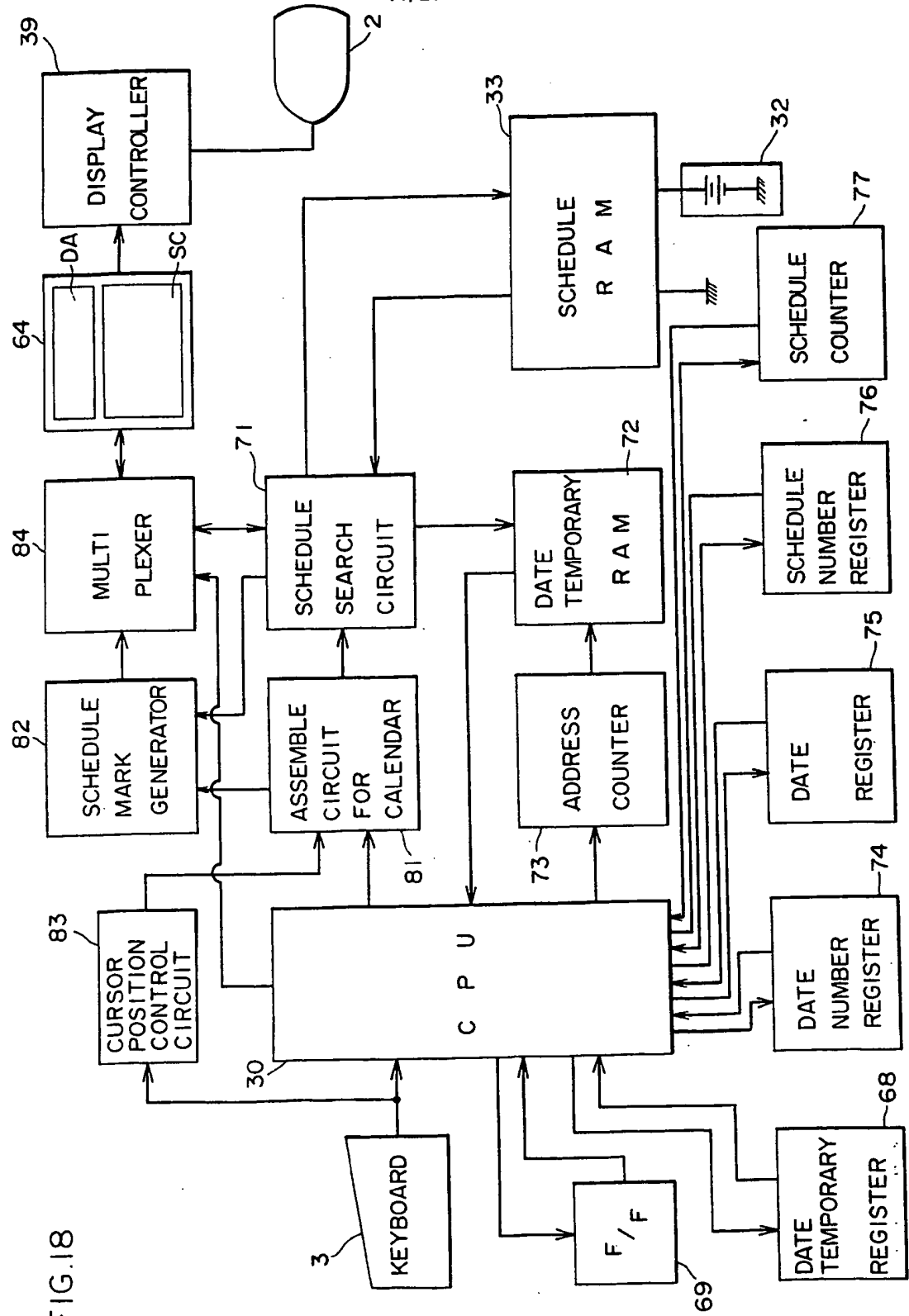


FIG. 18

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FIG 19

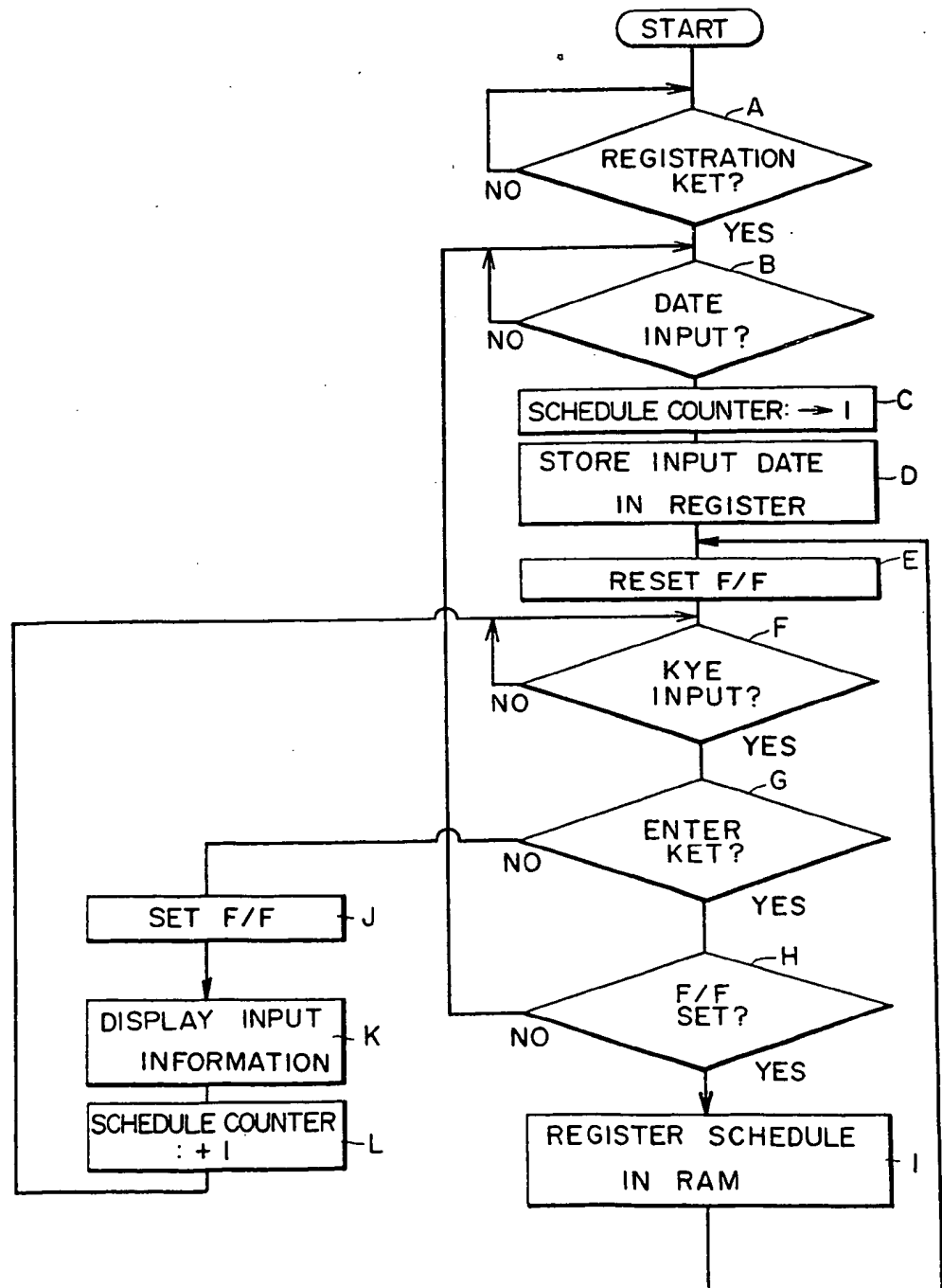


FIG. 20

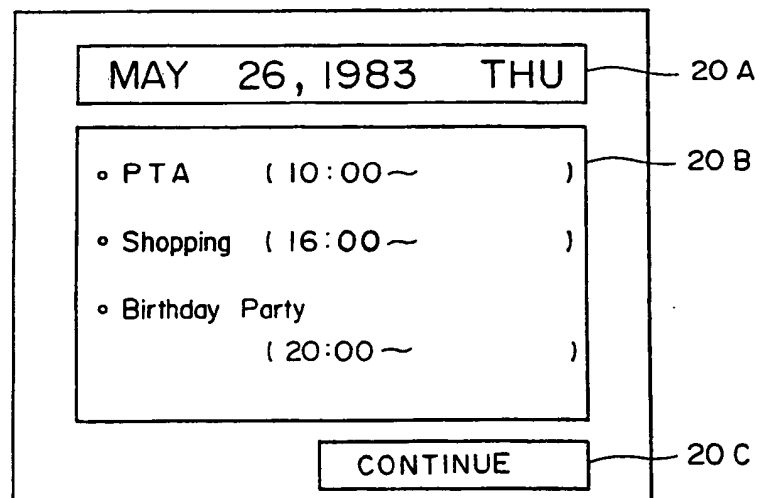
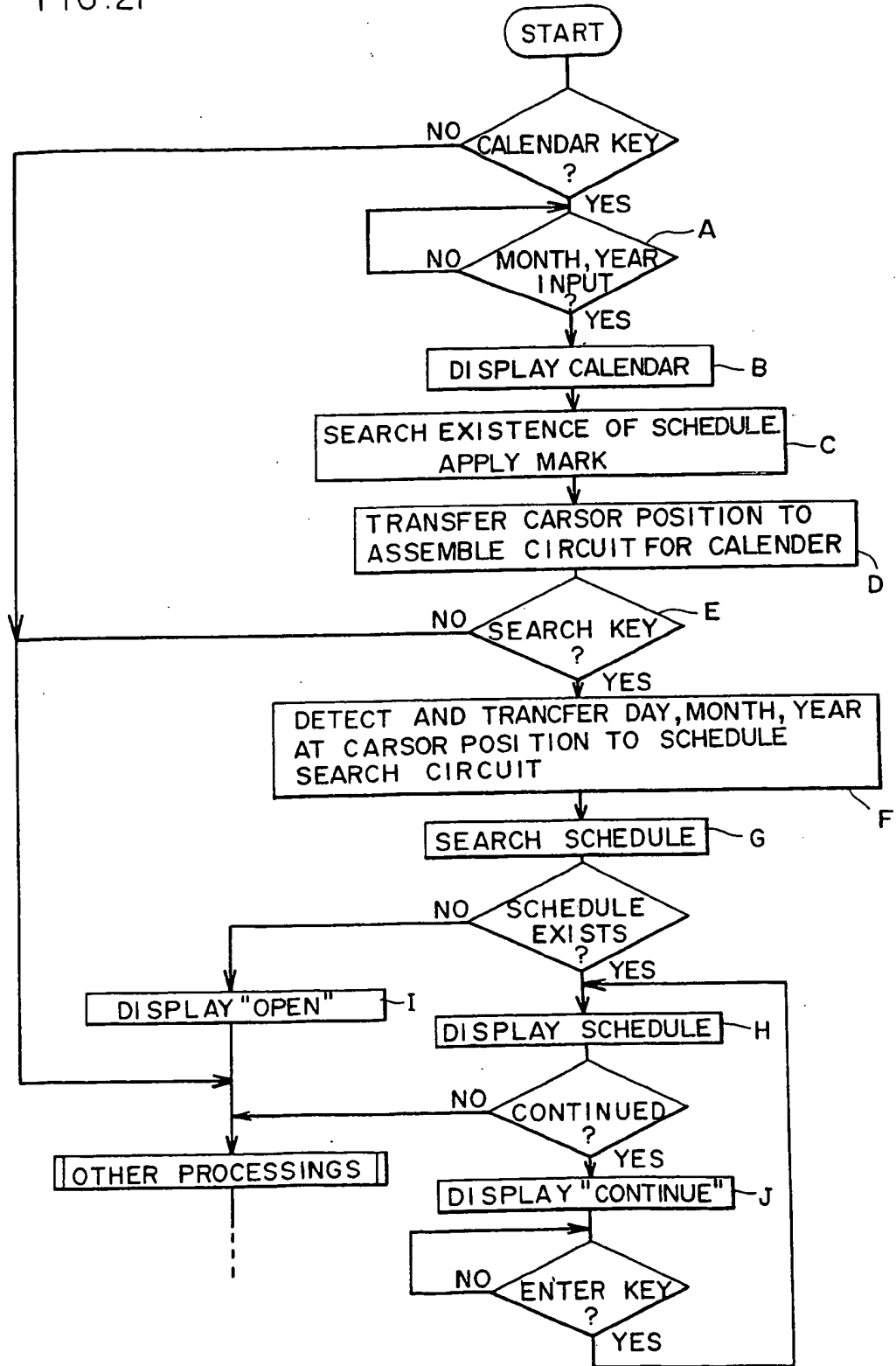


FIG. 2i



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FIG. 22

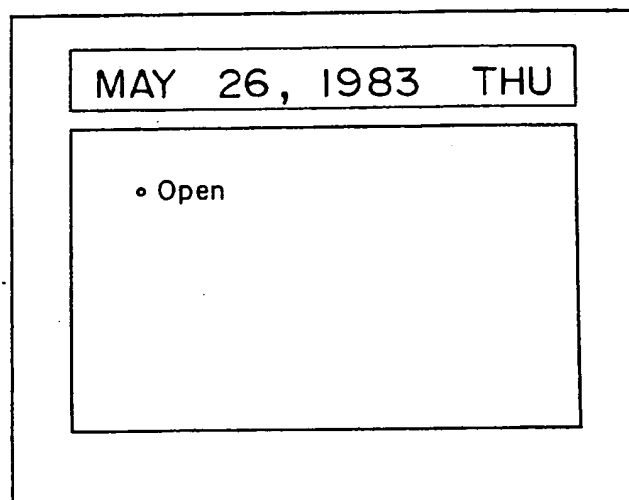


FIG.23

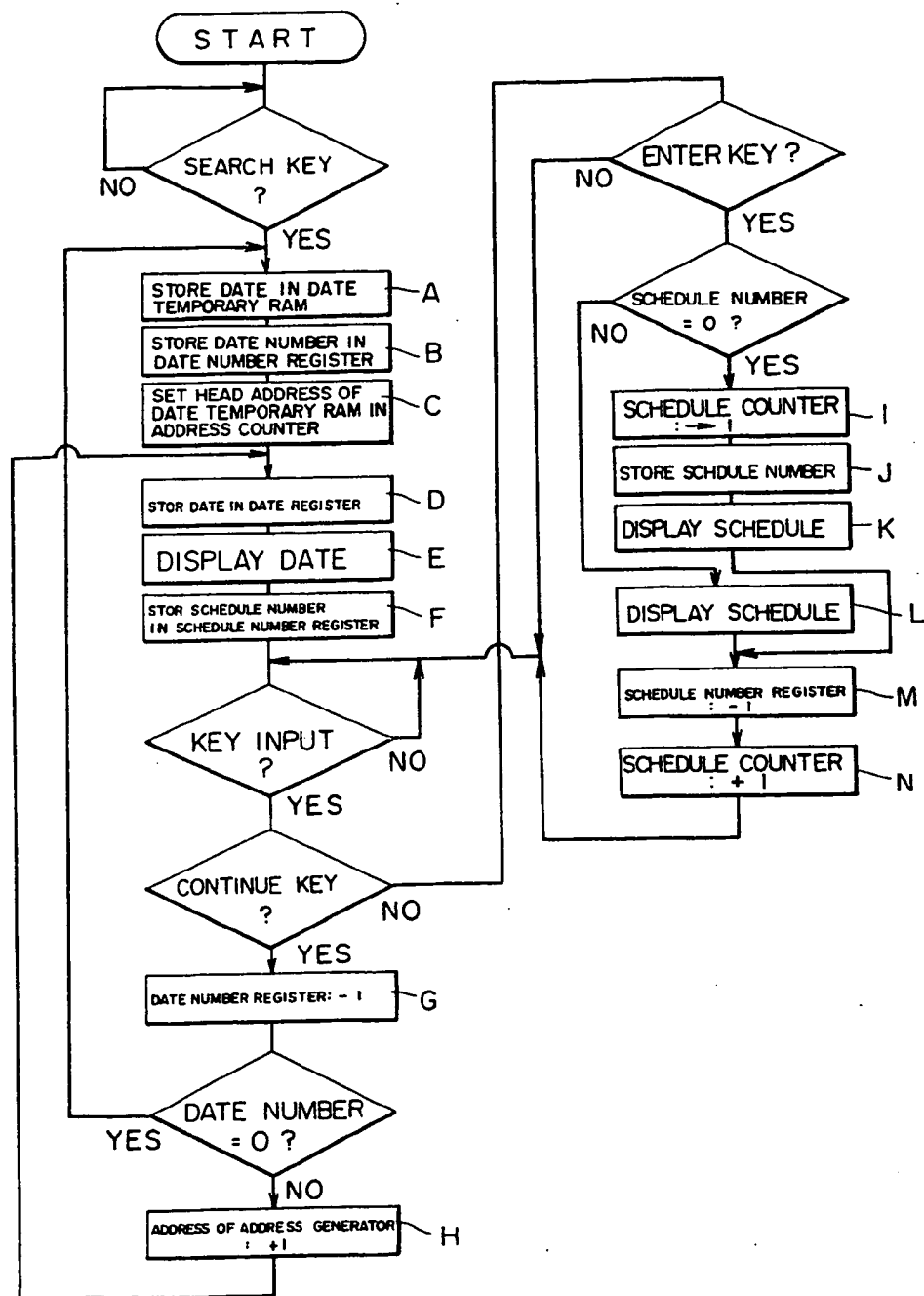
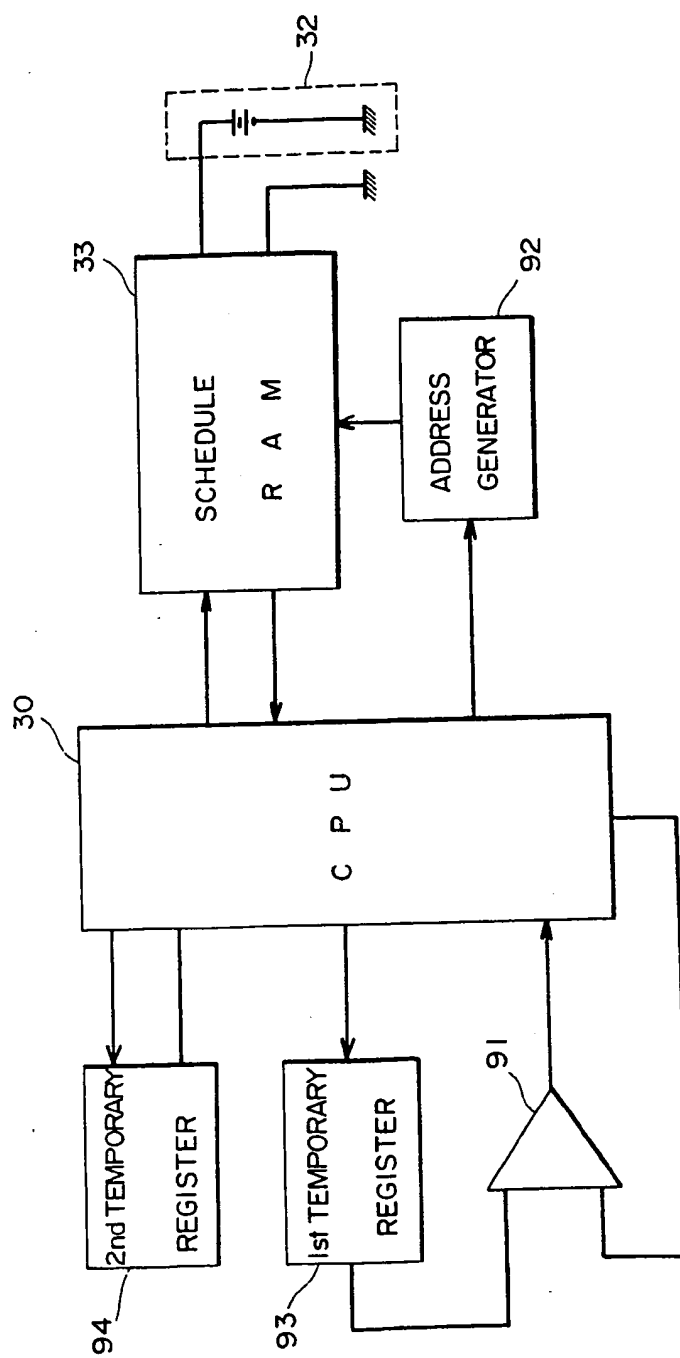


FIG. 24



[illegible]

FIG. 26

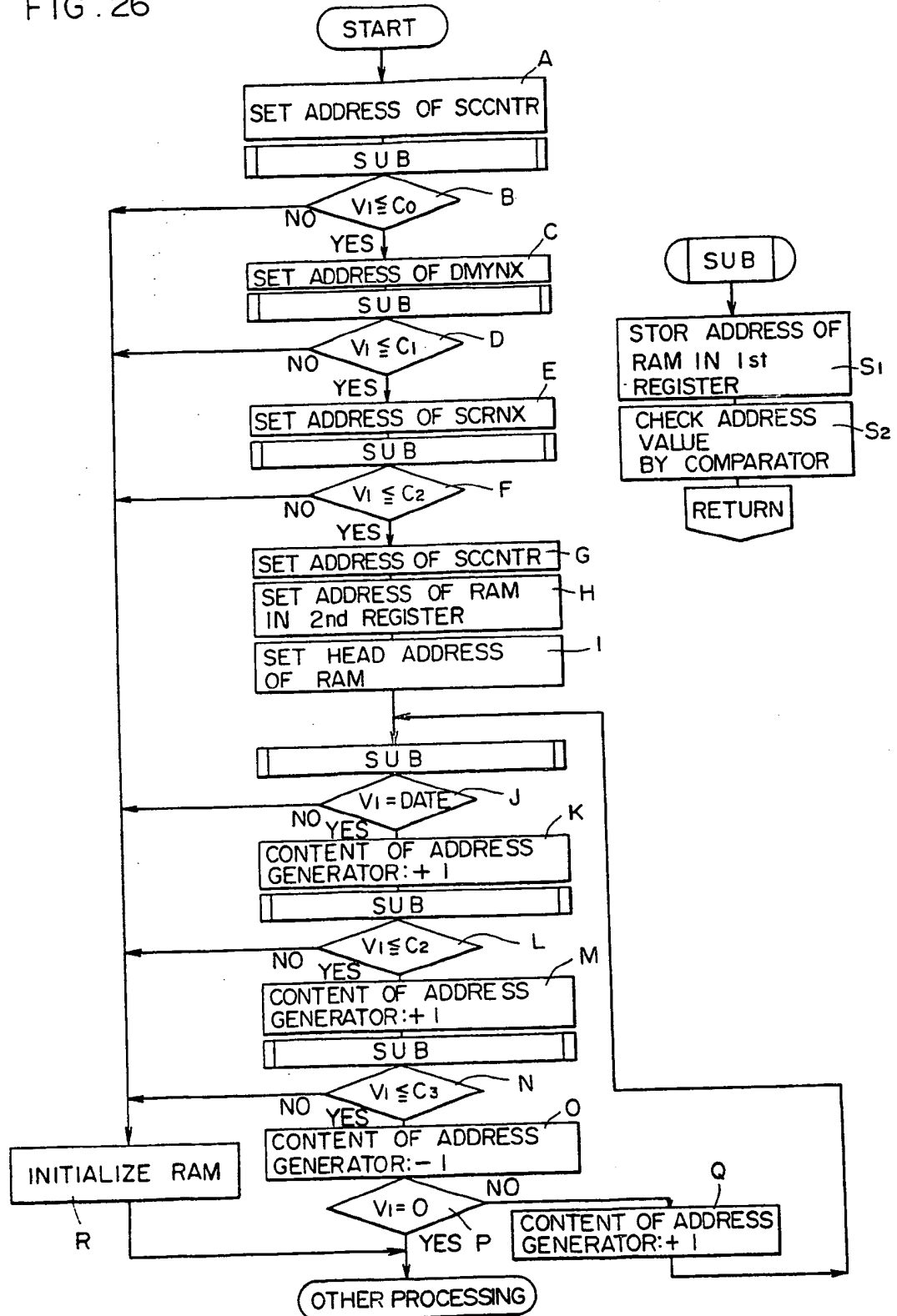
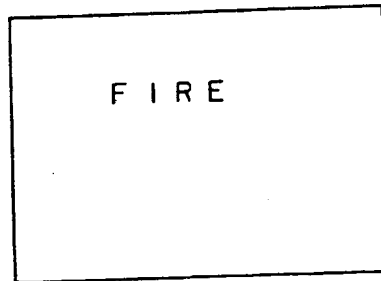


FIG.27



SPECIFICATION

Home controller

- 5 This invention relates to a home controller which controls cooking apparatus, such as electronic ranges or the like, air conditioners, or TV set; monitors household crime-prevention monitors, fire detectors, rainfall detectors
10 or the like; or records household functions, family schedules, and so on.

- The home controllers for home use have hitherto been proposed which provide various function. Concretely the home controller can
15 perform, for example, centralized control of household electric appliances, monitoring thereof, or recordings or reading out events, such as a memorial service or a children's sports day, a birthday of family or relative, or
20 schedules of family members (to be hereinafter called merely the schedules).

- The schedule management is complete only when the schedule contents correspond to the date. For this purpose, the date and schedule
25 are managed in pair. Hence, for reading out the schedule contents, the date should previously be given so that it is very troublesome to operate number-keys each time the date is given.

- 30 Also, the usual schedule management aims mostly at a short period within about one week, whereby it cannot but be said that the input of date each time the schedule content is read out is in vain.

- 35 In a case where two or more schedules are registered on the same date, the date is required to be entered each time one schedule is registered, which is very troublesome for users.

- 40 Also, in a case of schedule management, it is indispensable for users to know the date on which the schedules are registered, but it is difficult to say that the conventional home controller is sufficient to operate concerning
45 the above point although it adopts the dialogical operation.

- Furthermore, in a case where the information as to the aforesaid schedule stored in a random access memory (RAM) is broken by
50 an external factor, such as noises or any internal factor, and is varied into the content not thinkable as the schedule information, there has been a possibility that the variant information has been read as programs to
55 lead to a runaway of the system.

- On the other hand, there are a large number of menus cookable by cooking apparatus, such as electronic ranges, controlled by the home controller so that it is impossible for the
60 user to keep in his mind ingredients necessary to cooking and recipe for each menu, whereby the fact is that the ingredients usually are arranged by reference to the cooking cards or cooking reference books so as to carry out
65 cooking. Hence, a home controller has hith-

erto been desired which is easy even for unskilled persons to carry out various cooker-

- 70 A first object of the invention is to provide a home controller which simplifies the input of date for read-out of schedule.

- A second object of the invention is to provide a home controller which aims at an improvement in operability for registration of
75 schedule, especially for that of a plurality of schedules on the same date.

- A third object of the invention is to provide a home controller which displays on a monthly calendar the date of registration of
80 schedule so that the user is easy to be informed of the registered date.

- A fourth object of the invention is to provide a home controller which checks by itself the information regarding schedules stored in
85 a memory, thereby preventing a runaway of the system.

- A fifth object of the invention is to provide a home controller which properly displays ingredients and recipes necessary to cook a
90 large number of menus by use of cooking apparatus to be controlled by the home controller.

- The above and further objects and features of the invention will more fully be apparent from the following detailed description with
95 accompanying drawings, in which:

- Figure 1* is an exterior view of an embodiment of a home controller of the invention,

- Figure 2* is a rear view of the main body
100 thereof,

- Figure 3* is a plan view of key arrangement at a keyboard,

- Figure 4* is a block diagram of the embodiment shown in Fig. 1,

- 105 *Figure 5* is a view of transition between the respective modes of the home controller of the invention,

- Figures 6, 7 and 8* show display screens in the modes in relation to the schedules,

- 110 *Figures 9 through 15* show display screens in the modes in relation to cookery,

- Figure 16* is a block diagram of the principal portion of the home controller of the invention for control of cooking apparatus,

- 115 *Figure 17* is a flow chart explanatory of operation of the home controller of the invention for controlling the cooking apparatus,

- Figure 18* is a block diagram of the principal portion at the home controller of the invention for registration and read-out of schedule,
120

- Figure 19* is a flow chart explanatory of operation of the home controller of the invention in a registration mode,

- 125 *Figure 20* shows the display screen for schedules searched in a registration or search mode,

- Figure 21* is a flow chart explanatory of operation of the home controller of the invention in a calendar mode,
130

Figure 22 shows a display screen of no registered schedule.

Figure 23 is a flow chart explanatory of operation of the home controller of the invention in the search mode.

Figure 24 is a block diagram of the principal portion at the home controller of the invention for checking a schedule storing random access memory.

Figure 25 is a structural view explanatory of the schedule storing random access memory.

Figure 26 is a flow chart of operation for self-check of the home controller of the invention, and

Figure 27 shows a display screen for security information.

An exterior form of the home controller of the invention is shown in Fig. 1, in which reference numeral 1 designates a home controller body, 2 designates a character display using a cathode ray tube and placed on the body 1, which may alternatively be a usual TV set, 3 designates a keyboard for giving various informations to the home controller body 1, and 4 designates a cooking apparatus, such as an electronic cooking range, controlled by the home controller body 1. In addition, the body 1, as shown in Fig. 2, is provided at the rear with; outlets 5, 5... for timers controlling electric apparatus, such as a TV set or an electric fan, other than the cooking apparatus 4; input terminals 6 for various sensors for controlling securities, such as a fire alarm, a rainfall detector, a crime-prevention detector, or a gas detector; and input terminals 7, 7... for the temperature probe for measuring a room temperature.

Figure 3 is a structural view of the keyboard 3, in which reference numeral 10 designates a monitor key, 11 designates a timer key, 12 designates a menu key, 13 designates a select key, 14 designates a list key, 15 designates an ingredient key, 16 designates a recipe key, 17 designates a start key, 18 designates a stop key, 19 designates a calendar key, 20 designates a today key, 21 designates a tomorrow key, 22 designates a search key, 23 designates a registration key, 24 designates a continue key, 25 designates an enter key, 26 designates an alpha-numeric keys, 27 designates a number-keys, and 28 designates a cursor control keys, the keys 12 through 18 relating to cooking, the keys 19 through 23 relating to function selection in connection with the schedules.

Fig. 4 is a block diagram of the home controller of the invention as a whole, in which reference numeral 30 designates a central processing unit (CPU) to govern general control of the home controller of the invention, 31 designates a clock circuit backed-up by a battery circuit 32 of charging system and counting clock data of month, day, day of week, hour, minute and second, the clock data being read and written with respect to

CPU 30, 33 designates a random access memory (RAM) backed-up by the battery circuit 32, 34 designates a RAM not backed-up by the battery circuit 32, 35 designates a read only memory (ROM), the ROM 35 and RAMs 33 and 34 constituting a main storage unit, 36 designates a ROM, which constitutes an auxiliary storage unit and compensates a shortage of address space at the home controller of the invention, 37 designates a data transmission controller circuit, which controls data transmission from the main storage unit to an external circuit and vice versa, or data transmission between the main storage unit and the auxiliary storage unit, 38 designates an interface for controlling the ROM 36 and data transmission control circuit 37, which provides the head address of ROM 36 when transmitting data thereof to RAM 34 and gives a transmission start signal to the data transmission circuit 37. Upon starting the transmission, the renewal of address of ROM 36 is repeated until the transmission is over, and 39 designates a display controller, which fetches in the order of display character codes transmitted from a video RAM region partitioning a specific region of RAM 34 and sends the character codes sequentially to a character generator ROM 40. Hence, the CPU 30, when intended to display optional, data, need only introduce the data into the video RAM region of RAM 34. The character generator ROM 40 has optional character pattern previously stored in the optional address so that data stored therein as address of character code from the display controller 39 is output toward a parallel-to-serial converter 41. Accordingly, the parallel-to-serial converter 41 converts parallel character data given from the character generator ROM 40 into serial video signals and gives the video signals to the display device 2, such as the character display, the keyboard 3 in Figs. 1 and 3 interposing the interface 43 when the CPU 30 detects condition of the keyboard 3. Reference numeral 44 designates an interface for controlling the cooking apparatus 4 in Fig. 1, which interposes between the cooking apparatus 4 and the CPU 30 when the key code is output to the cooking apparatus 4, or when the operating information is obtained therefrom 45 designates a timer output controller, 46 designates a detector for input signals from various sensors 47, 47..., 48 designates an analog-to-digital converter for converting the input signal from a temperature probe 49 into a digital value, 50 designates a data bus, 51 designates an address bus, and 52 designates a control bus.

In such construction, the system program of the home controller is stored in part of ROM 35 of the main storage unit and the parameter and other constants for having access to ROM 36 of the auxiliary storage unit are stored in the remaining part of ROM 35, the

RAM 34 being used as the work area for programming. Even when the power supply for the system is cut off, the data, such as registered schedules, is stored in RAM 33 battery-backed-up, thereby being not erased.

Also, the home controller of the invention enables processing of recipe data of up to several hundreds kinds so that when one menu is selected from the above, ingredients necessary to cooking and recipe thereof are displayed at the display device 2, these recipe data being stored in the auxiliary storage unit: ROM 36 and read out at need.

Next, explanation will be given on operation of the home controller of the invention in accordance with Fig. 5 showing the transition between the respective modes.

The control system of the invention displays various informations on the display device 2 by virtue of input signals from the keyboard 3, thereby representing states of system program. Assuming that the system state is called a mode, Fig. 5 shows relations between the respective modes, in which reference M0 designates a basic monitor mode, M1 designates a timer mode, M2 designates a menu mode, M3 designates a select mode, M4 designates a list mode, M5 designates an ingredient mode, M6 designates a recipe mode, M7 designates a calendar mode, M8 designates a today mode, M9 designates a tomorrow mode, M10 designates a search mode, and M11 is a registration mode.

The present system carries out various initializations after turn-on of power supply, and there after automatically reaches the monitor mode M0, which displays the present time, date, temperature, timer setting condition, and existence of schedule. Fig. 6 shows the display screen in the monitor mode M0, in which the present date and time and the like are displayed in a frame at the upper portion of screen, indoor and outdoor temperatures in Fahrenheit scale and Celsius scale are displayed below the frame, it is displayed below the temperature whether or not each timer to be controlled by the home controller of the invention is in condition of programming and now on operation, it is displayed below the timers that the today or tomorrow schedule read-out is selective, and at the lowest portion of screen is displayed each mode enabling transition from the present display state (monitor mode M0). Thus, the monitor mode M0 enables the user for the system to be informed at a glance of all the informations.

The timer mode M1 enables timer setting and resetting, and concretely assigns desired channels and sets on and off conditions (on-time and off-time) to thereby enable on-off control of each timer. The display screen of timer mode M1 is shown in Fig. 7, in which within a frame at an upper half of screen are displayed a number of each timer and on-time and off-time set to the timer, or the on-off

setting by operation of sensors S1 and S2 and so on, and at a lower half of screen is displayed an operating method for each timer.

The menu mode M2 through recipe mode M6 are cooking relating modes by the cooking apparatus 4, which will be discussed below.

In the calendar mode M7, a one month calendar is displayed, which includes the date displayed in the monitor mode M0, that is, today. Fig. 8 shows the display screen in the calendar mode M7, in which the day for schedule registration is marked with an asterisk (*) and at the rightwardly lower corner appears a cursor to assign the date. In addition, when the continue key 24 is operated in the display state in Fig. 8, the next month calendar is displayed. The today mode M8 and tomorrow mode M9 display schedules on the day and the next day. The search mode M10 and registration mode M11 are for schedule search and registration respectively. In addition, the schedule data to be registered are stored in RAM 33 battery-backed-up.

Next, explanation will be given on the transition procedures between the respective modes. For example, in the state in Fig. 6, transition from the monitor mode M0 to timer mode M1 is carried out by operating the timer key 11 at the keyboard 3, restoration from the timer mode M1 to the monitor mode M0 by operating the monitor key 10. The transition from the mode M0 to the calendar mode M7 is carried out by operating the calendar key 19, and those to the today mode M8, tomorrow mode M9, search mode M10 and registration mode M11 are carried out by the today key 20, tomorrow key 21, search key 22 and registration key 23 respectively.

Next, explanation will be given on the menu mode M2 through recipe mode M6 in relation to cooking. Upon operating the menu key 12 in the state of the monitor mode M0, the monitor mode M0 transitions to the menu mode M2 to thereby display the major sorting of kinds of cooking. Fig. 9 shows the display screen in the menu mode M2, in which the major sorting list is displayed within a frame, simple explanation for the operating method is displayed above the frame, and the select mode M3 and monitor mode M0 possible to be selected are displayed below the same. The menu mode M2 is for displaying on one screen the list of rough sorting of cooking, such as appetizers, soup, drinks, and etc. and enables the user to select the cooking menus while looking at the list. Also, the menu mode M2, in a case where the number-keys 27 is operated to apply numerals corresponding to the list on the display screen, transitions to the list mode M4, at which time, in a case where the monitor key 10 is operated, the menu mode M2 transitions to the monitor mode M0, and in a case where the select key 13 is operated, the same transitions to the

select mode M3, in which the recipe number corresponding to desired recipe is given.

Upon selecting thus desired recipe, the list mode M4 transitions to the ingredient mode

- 5 M5, and in the list mode M4, designations of meals including the menu selected in the menu mode M4 are displayed on the display device 2. Fig. 10 shows the display screen when the CHICKEN of the major sorting NO. 9 is selected as an example from the menu mode M2 in Fig. 9, in which menus from NO. 122 through NO. 134 using CHICKEN as the main ingredient are displayed, above the menu is displayed the operational method to
- 10 select the transition to the ingredient mode M5 or to start the cooking by the cooking apparatus 4, and below the menus are displayed the operational method for displaying other menus not displayed according to the size of screen. When the user looks at the menu list and selects a desired menu by operating the number-keys 27, the list mode M4 transits to the ingredient mode M5, in which ingredients necessary to cook the menu selected in the select mode M3 and list mode M4 are displayed as shown in Fig. 11. Fig. 11 shows the display screen when, for example, BARBECUED CHICKEN, NO. 123 in the list mode M4 in Fig. 10 is selected, in which a menu number is displayed at the uppermost portion of screen, an amount of four servings below the menu number, and kinds and quantities of ingredient below the amount, and at the lowermost portion is displayed the transition to other modes or a start of operation of cooking apparatus 4 possible to be selected. The user arranges the ingredients by looking at the display screen. When the recipe key 16 is operated after checking arrangement of ingredient, the ingredient mode M5 transits to the recipe mode M6 so that the recipe for the menu is displayed as shown in Fig. 12, in which the recipe for the BARBECUED CHICKEN displayed in the ingredient mode M5 in Fig. 11 is displayed within a frame and the other modes enabling transition from the present state is displayed below the frame. Thus, the user need only cook in compliance with the recipe mode M6 the ingredients arranged according to instruction by the ingredient mode M5.

- When the start key 17 is touched in the ingredient mode M5 and recipe mode M6, the preset key code sequence is given to the cooking apparatus 4 and the predetermined cooking is started. Upon starting cooking by the cooking apparatus 4, the display device 2 displays this matter (Fig. 13). In a case where the cooking started as the above is required to be forcibly interrupted, the stop key 18 is touched to interrupt the cooking of the cooking apparatus 4 to thereby allow the display device 2 to display the interruption as shown in Fig. 14. Upon completing the predetermined cooking by cooking apparatus 4, the

display device informs the user of the finished cooking by display as shown in Fig. 15.

- In addition, during the cooking by use of the home controller of the invention, the controller supervises operation of of cooking apparatus 4 always independently of the respective modes M2 through M6. For example, when the cooking apparatus 4 stops its operation, the home controller properly indicates it for the user after the factor of operation stop is checked up. Also, the user of the home controller of the invention operates the key at the keyboard 3 according to instruction on the display device 2 without directly touching the cooking apparatus 4, thereby enabling remote control thereof. Thus, a failure in cooking caused by a misoperation of cooking apparatus 4 is preventable.

- Referring to Fig. 16, the principal portion of the home controller of the invention for controlling the cooking apparatus 4 is shown in the block diagram, in which reference numeral 30 designates a CPU, 3 designates a keyboard as shown in Figs. 1 and 3, 60 designates a state controller including a stage management pointer, a register for a recipe menu number, and timing and state control, 61 designates an address generator/converter, 62 designates an address counter, 36 designates a ROM storing therein the recipe data, 64 designates a video RAM within the RAM 34, 39 designates a cathode-ray tube (CRT) controller for controlling the CRT display 2 of display device, and 44 designates an interface of cooking operation controller for controlling the operation of cooking apparatus 4.

- Next, explanation will be given on operation of the controller constructed as the above by reference to the flow chart in Fig. 17 representing the processing contents of CPU 30.

- When the menu key 12 is operated in the initial state, the state controller 60 stores the recipe mode (A), the head address storing the major sorting list of kinds of recipe stored in ROM 36 is transferred to the address counter 62 (B), the state controller 60 fetches the transferred character number within ROM 36, the address counter 62 is controlled to transfer the major sorting list to video RAM 64, and the CRT display 2 displays the list via the CRT controller 39 as shown in Fig. 9 (C); observing the major sorting list, for example, NO. "9" corresponding to the desired recipe "CHICKEN" is given and fetched successively into the state controller 60 and the operation stage management pointer is cleared (D); the enter key 25 is operated to transfer to the address counter 62 the head address of ROM 36 storing the table and byte count in the selected major sorting list so that the selected menu is displayed on the CRT display 2 via the video RAM 64 and CRT controller 39 as shown in Fig. 10 (E); when "BARBECUED CHICKEN" among the "CHICKEN" cooking is selected in the above state, the state controller

60 clears the operation stage management pointer (F); the state controller 60 transfers to the address counter 62 ingredients necessary to selected recipe and the head address of ROM 36 storing therein the memory byte number, thereby being displayed the contents of ROM 36 on the CRT display 2 (G) (see Fig. 11); and upon operating the start key 17 in the above state, the cooking operation starts, but if the recipe is not apparent, the recipe key 16 is touched, then the display byte number of recipe corresponding to the state controller 60 and the stored head address of ROM 36 are transferred to the address counter 62 to thereby recipe information are read-out from ROM 36 and displayed on the CRT display 2 as shown in Fig. 12 (H)q. In a case where the ingredients are required to be re-checked, the ingredient key 15 is operated to display the ingredient list in Fig. 11, and when not required, the start key 17 is operated.

Now, the start key 17 is operated to start actual cooking by the cooking apparatus 4. The address generator/converter 61 at first generates the address of ROM 35 storing therein the operation control information for the cooking apparatus 4 corresponding to the selected recipe, the address is transferred to the cooking apparatus controller 44 through the address counter 62 and ROM 36 (I); the transferred information is sent out as the key information as to the cooking apparatus 4 to start operation thereof (J); the cooking apparatus 4, when in operation, is deemed normal and the condition of normal operation is transmitted to the state controller 60 and displayed on the CRT display 2 (K) (see Fig. 13); and when the stop key 18 is operated, or the operation control is finished, operation is stopped and, if not interrupted, the finish of cooking is displayed on the CRT display 2 as shown in Fig. 15 (L); and then the controller is restored to the initial state.

On the other hand, in a case that the cooking apparatus 4, even when intended to start, does not operate, a misoperation is transmitted to the state controller 60 and displayed by the display 2 (M). When the menu key 12 is operated in such condition, the home controller returns to the initial state, or when the menu key 12 is not operated but the start key 17 is operated, reworking operation of the cooking apparatus 4 is carried out.

On the other hand, in a case of interrupting the operation; interruption of cooking is displayed on the CRT display 2 (N, see Fig. 14); the operation stage management pointer within the state controller 60 is incremented (O); and the start key 17 is operated to give to the address counter 62 from the address generator/converter 61 the head address of ROM 36 storing the subsequent cooking operation control information due to the operation

stage management pointer and present recipe number information, thereby allowing the cooking apparatus 4 to operate as the same as the former case (P).

As seen from the above, in a case where the home controller of the invention is used for cooking, the desired menu is selected so as to display necessary ingredients and recipe therefor, whereby those even unskilled in recipe can perform their desired cooking and expand the cooking repertory.

Referring to Fig. 18, part of the home controller of the invention as to registration and read-out of schedule is shown in the block diagram, in which reference numeral 3 designates the keyboard shown in Figs. 1 and 3, 30 designates the CPU, 33 designates the aforesaid RAM, which is backed up by a battery circuit 32 and used as a schedule RAM, 68 designates a date temporary register, 69 designates a flip-flop for storing whether or not the date is in-put, the register 68 and flip-flop 69 being used mainly in the registration mode M11.

Reference numeral 71 designates a schedule search circuit to search the storage contents of schedule RAM 33, 72 designates a date temporary RAM, 73 designates an address counter, 74 designates a data number register, 75 designates a date register, 76 designates a schedule number register, and 77 designates a schedule counter, which are used mainly for searching the schedules of date assigned in the search mode M10.

Reference numeral 81 designates an assemble circuit for calendar which arranges calendar data per one month, 82 designates a schedule mark generator, by which marks, such as asterisks *, are applied to the calendar assembled by the assemble circuit for calendar 81 corresponding to the date of schedule stored in the schedule RAM 33, 83 designates a cursor position control circuit which controls the cursor on the display screen of the CRT display 2 corresponding to operation of cursor control keys 28 at the keyboard 3, and 84 designates a multiplexer which properly switches by control of CPU 30 the signals from the cursor position control circuit 83 and schedule search circuit 71 or the like, and outputs the switched signals to the video RAM 64.

The aforesaid assemble circuit for calendar 81, schedule mark generator 82, and cursor position control circuit 83 are used mainly for schedule search by moving the cursor on the calendar in unit of one month in the calendar mode M7.

The video RAM 64 has the date region DA and schedule region SC so that data once stored therein is output to the display controller 39, thereby being displayed on the CRT display 2.

Next, explanation will be given on operation during the schedule registration according to

the flow chart showing the processing contents of the CPU 30 in the registration mode M11 in Fig. 19.

From the initial stage, the registration key 23 is supervised as to whether or not it is registered (A), when the registration key 23 is operated to enter into the registration mode M11, the input of date is checked (B), when the date is in-put, the schedule counter 77 is initialized (count value of it is one) (C), and the date is stored temporarily in the date temporary register 68 (D), the flip-flop 69 is reset (E), the key input from the keyboard 3 is checked (F), the key input, when in-put, is checked as to the enter key 25 (G), if no enter key input, the flip-flop 69 is kept in set condition (H), and the input information is numbered with count value of schedule counter 77, and transferred as the schedule contents to the video RAM 64 and stored therein and displayed on the CRT display 2 through the display controller 39 (I), and then the schedule counter 77 is added "one" (L). When the schedule contents are given and displayed, the process returns to the key input supervising step (F) so that, as far as the enter key 25 is not operated, the schedules on the same day are registered without the date input one by one. On the other hand, upon operating the enter key 25, the process is converted to observe the flip-flop 69 (J), when the flip-flop 69 is in set condition, in other words, in condition of being in-put the schedule contents, the schedule contents stored temporarily in the video RAM 64 and the date stored in the date temporary register 68 are transferred to schedule RAM 33 and stored therein (K), and then the flip-flop 69 is reset (E). Also, when the flip-flop 69 is reset, the process is returned to the date input wait step (B).

Referring to Fig. 20, an example of display screen in the schedule registration mode M11, in which two or more schedules as shown on the schedule display unit 20B are registered on the same day: May 26, 1983, shown on the date display unit 20A.

Thus, the home controller of the invention is capable of registering plural schedules only in the contents thereof in the schedule registration mode M11 after the date input is carried out during the schedule registration. Since the controller is kept in condition of being acceptable of date input, when a plurality of schedules are registered on the same day, the date input at every schedule is not necessary and there is no fear of misinput, thereby improving the operational efficiency.

Next, explanation will be given on schedule read-out by calendar display in accordance with the flow chart of processing contents of CPU 30 in the calendar mode M7 in Fig. 21.

In the initial state, the calendar key 19 is operated for calendar display, thereby entering into the calendar mode M7. Upon input-

ing desired year and month from the number-keys 27 at the keyboard 3 (A), the assemble circuit for calendar 81 assembles a calendar of the assigned month and displays on the CRT display 2 as shown in Fig. 8 (B). Next, the schedule search circuit 71 surveys whether or not the schedules are registered for one month assigned, so that the schedule mark generator 82 applies a mark, (for example, asterisk *) onto the date on which schedule is registered. In such state, the schedule is checked in such a manner that the cursor control keys 28 at first is operated to position the cursor on the desired date (D) and the search key 22 is operated (E), so that the cursor position control circuit 83 transfers the present position of cursor to the assemble circuit for calendar 81 and the assigned date, that is, the cursor positioning date, is detected from the calendar display data and cursor position data, and transferred to the schedule search circuit 71 (F). The schedule corresponding to the assigned date is searched from the schedule RAM 33 (G). The schedule, when registered, is displayed on the CRT display 2 through the video RAM 64 and display controller 39 as shown in Fig. 20 (H), and when no schedule is registered, its display is carried out as shown in Fig. 22 (I).

In a case where the registered schedules are impossible to be displayed on one screen, "CONTINUE" is displayed on the display section 20C as shown in Fig. 20. In this case, the enter key 25 is operated to display the remainder schedules.

As seen from the above, the home controller in the calendar mode M7 displays a calendar per month in which the day of registered schedule is marked as prescribed. The cursor is positioned on the desired day at the calendar to display schedules of the day, whereby the existence of schedule is known with ease and its contents are checked by simple operation.

Next, explanation will be given on operation for schedule search not in the aforesaid calendar mode M7 but in the usual search mode M10 according to the flow chart of processing contents of CPU 30 in Fig. 23.

In the initial state, the search key 22 is operated and the schedule search circuit 71 searches the schedules registered in the schedule RAM 33. Also, the schedules after today are read in the order of nearer dates in the future and the date is stored temporarily into the date temporary RAM 72 (A), the number of read-out dates is stored in the date number register 74 (B) and the head address of date temporary RAM 72 is set in the address counter 73 (C). Next, the date assigned by the address set by the address counter 73, that is, the nearest date on which the schedule is registered, is fetched from the date temporary storage RAM 72 and stored in the date register 75 (D), the date stored therein is trans-

ferred to the date region DA at the video RAM 64, and the date is displayed on the CRT display 2 through the display controller 39 (E), at which time the schedule region SC of the video RAM 64 is cleared and no schedule is displayed on the CRT display 2. In succession, the number of schedules on the same day as the date stored in the date register 75 is searched by the schedule search circuit 71, the number of schedules being stored in a schedule number register 76 (F).

Next, it is checked up whether the key on keyboard 3 is operated, so that when the operated key is the continue key 24, logical "1" is subtracted from the contents of date number register 74 (G). If the subtraction result is not logical "0", logical "1" is added to the content of address counter, 73 (H). The date assigned by the address added with logical "1", in other words, the second nearer day on which schedule is registered, is fetched from the date temporary RAM 73 and stored in the date register 75 (D), thereby displaying the date on which the subsequent schedule is registered.

In a case where the content of date number register 74 is at logical "0", the schedule search circuit 71 searches the schedule in the schedule RAM 33 and then the process returns to the step (A) wherein the schedules are read-out in the order of nearer dates and stored temporarily in the date temporary RAM 72.

On the other hand, in a case where the continue key 24 is not operated, the enter key 25 is operated, and the content of schedule number register 76 is at a logical "0", the schedule counter 77 is initialized and its count value is turned to one (I), and then the schedule search circuit 71 searches schedules having the same date as that stored in the date register 75, in other words, the date displayed on the CRT display 2, the number of schedules being transferred to and stored in the schedule number register 76 (J). Also, the first number schedule of date the same as that stored in the date register 75 are searched by the schedule search circuit 71, the contents of schedule being stored in the schedule region SC of the video RAM 64 and displayed on the CRT display 2 through the display controller 39 (K). After this process, logical "1" is subtracted from the schedule member register 76 (M), and then the schedule counter 77 is counted up one by one (N).

Meanwhile, in a case where the schedule number register 76 is not at logical "0", the schedule search circuit 71 searches schedule corresponding to the count value of schedule counter 77 on the date the same as that stored in the date register 75, in other words, displayed on the CRT display 2, the contents of schedule different from the schedule region SC at the video RAM 64 are stored in the

schedule region SC and then displayed on the CRT display 2 through the display controller 39 (L). When the schedule is displayed on the CRT display 2, logical "1" is subtracted from the schedule number register 76 (M) and the schedule counter 77 is counted up one by one (N), and then the process returns to the step of checking the existence of key input.

The transitions from the schedule search mode M10 to the monitor mode M0, calendar Mode M7 and register mode M11, are carried by operating the monitor key 10, calendar key 19 and registration Key 23 respectively. In addition, the display example on the display 2 in the schedule mode M10 is the same as that in Fig. 20.

As seen from the above, the home controller of the invention in the search mode M10 displays the nearest date in future, for example today or tomorrow, on which the schedule is registered, and then displays by operating the continue key 24 the next date on which the schedules are registered. Also, when the enter key 25 is operated, the schedules registered on the date at that time are displayed. Therefore, for reading the schedules, there is no need of operating the number-keys 27 in order to change the date, thereby facilitating the operation of the controller.

Referring to Fig. 24, a construction for preventing a runaway of the home controller of the invention is shown.

In the same drawing, reference numerals 30, 33 and 32 designate the CPU, schedule RAM and battery circuit for backup thereof, 91 designates a comparator, 92 designates an address generator, 93 designates a first temporary register, and 94 designates a second temporary register.

Incidentally, the memory contents of schedule RAM 33 is constituted as shown in Fig. 25, in which reference SCCNTR designates a schedule counter, which is constituted of 1 byte so as to count the schedule register number of, for example, 60 at a maximum. A SCRAM is a region for storing the concrete content of schedule, the storage content being dated. A SCRNX is a pointer to the SCRAM and appoints regions for the subsequently registered items. A DMYST is a day-month-year start address terminal counter and comprises data (date region), add (address region storing the schedule content of SCRAM) and tc (data quantity region for each schedule), DMYNX being a pointer for DMYST.

Next, explanation will be given on operation for preventing a runaway of the home controller of the invention by reference to the flow chart in Fig. 26.

In the flow chart, upon selecting the schedule mode, address of SCCNTR is set in the address generator 92 (A) and processing transferred to a subroutine (SUB). In the subroutine, the address value of schedule RAM

33 assigned by the address generator 92 is stored in the first temporary register 93 (S1), and the address value thereof is checked by the comparator 91 (S2). Successively, it is checked whether or not the value V1 of first temporary register 93 is kept under the upper limit C0 of register number (B). When the value V1 is in the upper limit, the address of DMYNX is set to the address generator 92 (C), and then processing transferred to the subroutine (SUB). Upon finish of processing at the subroutine, the value V1 of first temporary register 93 at that time is checked as to whether or not it is kept within the last address C1 at the region DMYST (D). When the value V1 is within the last address C1, address of SCRYNX is set in the address generator 92 (E), and then processing jumps to the subroutine (SUB). Upon finish of processing at the subroutine, it is checked whether or not the value V1 of the first temporary register 93 is kept within the last address C2 of region SCRAM (F). When the value V1 is kept in the same, address of SCCNTR is set in the address generator 92 (G), the address value of RAM 95 assigned by the address generator 92 is set in the second temporary register 94 (H), and the head address of region DMYST of the RAM 33 is set in the address generator 92 (I).

Continuously, it is checked whether or not the value V1 of first temporary register 93 coincides with the date through the subroutine (SUB) (J). As the result of check, when the value V1 of first temporary register 93 coincide with the date, the content of address generator 92 is added with logical "1" (K) and processing jumps to the subroutine (SUB). After return from subroutine, the value V1 of first temporary register 93 is checked as to whether it is kept within the last address C2 of the region SCRAM (L). When the value V1 is in the same, the content of address generator 92 is added with logical "1" (M), and processing jumps to the subroutine (SUB) again. Thereafter, it is checked whether the value V1 of first temporary register 93 is kept under the upper limit C3 of registerable data quantity per item of schedules (N). When the value V1 is under the upper limit C3, logical "1" is subtracted from the content of second temporary register 94 (O), which is checked as to whether or not it is at logical "0" (P). If not "0", the content of address generator 92 is added with logical "1" (Q) and then processing returns to the step to check whether or not the date of first temporary register 93 coincides with the value V1. Or, when the value V2 of second temporary register 94 is at logical "0", the processing shifts to other steps. Also, when the decision result at each decision step (B), (D), (F), (J), (L) or (N) is non, the schedule RAM 33 is entirely initialized (R) and then processing transfers to other steps.

As seen from the above, the home control-

ler of the invention checks the content of schedule RAM 33 prior to schedule operation, whereby the content is automatically checked. Hence, if the data becomes meaningless by noises or the like, the schedule RAM 33 is automatically initialized, thereby strengthening the supervisory function of schedule and also completely preventing a runaway of the system.

Furthermore, the home controller of the invention always monitors the input from the sensor 47, 47 . . . independently of the processing in the respective modes M0 through M11 shown in Fig. 5. Hence, when the sensor output is in-put from each sensor 47, the CPU 30 checks the input signal through the input signal level detect circuit 46 to thereby display the corresponding security information on the CRT display 2 as shown in Fig. 27.

As this invention may be embodied in several forms without departing from the spirit of essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within meets and bounds of the claims, or equivalence of such meets and bounds thereof are therefore intended to be embraced by the claims.

CLAIMS

1. A home controller for centralized controlling of a plurality of functions, such as a control function for electric appliances of home use, a monitoring function to out-put command corresponding to the information from various sensors installed in the home or a scheduling function for registration of household events or schedules of family members, comprising:

a date storage means for storing the date of schedule,
a schedule storage means for storing the content of schedule corresponding to date,
a display device for displaying the stored contents of said storage means,
a first instructing means for successive renewal of said date, and
a second instructing means for read-out of the content of said schedule storage means, whereby, when said first instructing means is operated, successive renewal of the date is carried out and the date is displayed on said display device, and
when said second instructing means is operated, the content of said schedule of the date displayed on said display device by the operation of said first instructing means is displayed on said display device.

2. A home controller as set forth in claim 1, wherein said control function includes control function for cooking apparatus, and comprising:

a menu storage means for storing menus cookable by said cooking apparatus,

an ingredient storage means for storing ingredients necessary to cooking for each of

5 said menus respectively,

a recipe storage means for storing a recipe of each said menus respectively,

a menu selecting means for selecting one of said menus stored in said menu storage

10 means,

whereby, said ingredients and recipe of the menu selected by said menu selecting means are displayed on said display device.

3. A home controller for centralized controlling of a plurality of functions, such as a control function for electric appliances of home use, a monitoring function to out-put command corresponding to the information from various sensors installed in the home or

20 a scheduling function for registration of household events or schedules of family members, comprising:
an assemble circuit for calendar which assembles calendar data for a predetermined

25 period,
a display device for displaying a calendar assembled by said assemble circuit,

a schedule storage means which stores the content of schedule corresponding to the date

30 thereof,
a schedule mark generator which applies marks onto the dates of registered schedule for a period corresponding to said calendar displayed on said display device,

35 a cursor position control circuit for controlling the position of a cursor on the display screen of said display device, and

a schedule survey circuit for surveying whether or not the schedule on the date corresponding to the cursor position is stored in said schedule storage means.

4. A home controller as set forth in claim 3, wherein said control function includes control function for cooking apparatus, and comprising:

45 a menu storage means for storing menus cookable by said cooking apparatus,

an ingredient storage means for storing ingredients necessary to cooking for each of

50 said menus respectively,

a recipe storage means for storing a recipe of each said menu respectively,

a menu selecting means for selecting one of said menus stored in said menu storage

55 means,

whereby, said ingredients and recipe of the menu selected by said menu selecting means are displayed on said display device.

5. A home controller for centralized controlling of a plurality of functions, such as a control function for electric appliances of home use, a monitoring function to out-put command corresponding to the information from various sensors installed in the home or

65 a scheduling function for registration of

household events or schedules of family members, comprising:

a schedule storage means for storing the content of schedules with date,

70 a date input storage means which stores information whether the input the date is carried out or not, and

a display device for displaying information of registered schedule,

75 whereby, at the registration operation of said schedule, in a case where said date input storage means stores that the input of the date is carried out, continuous inputs of the contents of plurality of schedules are allowed, and in a case where said storage means stores the input of said date is not yet carried out, the input of a date is allowed.

6. A home controller as set forth in claim 5, wherein said control function includes control function for cooking apparatus, and comprising:

85 a menu storage means for storing menus cookable by said cooking apparatus,

an ingredient storage means for storing ingredients necessary to cooking for each of

90 said menus respectively,

a recipe storage means for storing a recipe of each said menus respectively,

a menu selecting means for selecting one of

95 said menus stored in said menu storage means,
whereby, said ingredients and recipe of the menu selected by said menu selecting means are displayed on said display device.

100 7. A home controller for centralized controlling of a plurality of functions, such as a control function for electric appliances of home use, a monitoring function to out-put command corresponding to the information

105 from various sensors installed in the home or a scheduling function for registration of household events or schedules of family members, comprising:

a schedule storage means for storing the content of schedule, and

110 a check means which checks whether or not the content of said schedule stored in said schedule storage means satisfies predetermined conditions as the schedule information.

115 whereby, prior to registration and read-out processing of said schedule, said check means checks the information stored in said schedule storage means and only when the predetermined conditions are satisfied, the registration and read-out processings are allowed to start.

8. A home controller as set forth in claim 7, wherein said control function includes control function for cooking apparatus, and comprising:

125 a menu storage means for storing menus cookable by said cooking apparatus,

an ingredient storage means for storing ingredients necessary to cooking for each of said menus respectively,

130 a recipe storage means for storing a recipe

of each said menus respectively,
a menu selecting means for selecting one of
said menus stored in said menu storage
means,

5 whereby, said ingredient and recipe of the
menu selected by said menu selecting means
are displayed on said display device.

9. A home controller substantially as here-
inbefore described with reference to and as
10 shown in the accompanying drawings.

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